

Adult



CLINICAL GUIDELINES	2
NAEPP Medication Guidelines	
ASTHMA	7
Definition	7
Causes of Asthma	7
Prevalence	7
Triggers	8
INITIAL ASSESSMENT	8
Establish Diagnosis	8
Signs and Symptoms	9
Physical Examination	9
Medical History	10
Medications and Response	10
Family History	11
Classify Severity	12
Prescribe Medications According to Severity	13
FOLLOW-UP CARE	14
Routine Visits to Assess Adequate Control	14
Monitor need for β -2 agonist	14
Treat Co-Morbid Conditions	14
Consider Evaluation by Asthma Specialist	15
OBJECTIVE MEASUREMENTS (NON-ACUTE)	16
Spirometry	16
Peak Expiratory Flow (PEF)	17
SUCCESSFUL MANAGEMENT TOOLS	17
Develop Written Asthma Management Plan	18
Action Plan for Exacerbations	18
Patient Education	19
Frequent Follow-up	19
Partner to Control Triggers	
SPECIAL CONSIDERATIONS	20
Acute Presentation: Description of Typical Presentation	20
Related Problems and Issues	22
Women and Asthma (Including Pregnancy)	23
Work-related Asthma	24
Seniors and Asthma	28
FAQs	32
REFERENCES	34

Clinical Guidelines: Stepwise Approach for Managing Asthma

The aim of asthma therapy is to maintain control of asthma with the least amount of medication and hence minimal risk for adverse effects. Control of asthma is defined as:

- Preventing chronic and troublesome symptoms (e.g., coughing or breathlessness in the night, in the early morning, or after exertion)
- Maintaining (near) "normal" pulmonary function
- Maintaining normal activity levels (including exercise and other physical activity)
- Preventing recurrent exacerbations of asthma and minimizing the need for emergency department visits or hospitalizations
- Providing optimal pharmacotherapy with minimal or no adverse effects
- Meeting patients' and families' expectations of and satisfaction with asthma care

The Stepwise approach to therapy, in which the dose and number of medications and frequency of administration are increased as necessary and decreased when possible, is used to achieve this control. Because asthma is a chronic inflammatory disorder of the airways with recurrent exacerbations, therapy for persistent asthma must emphasize efforts to suppress inflammation over the long term and prevent exacerbations. Recommendations in the stepwise approach to therapy are based on the National Asthma Education and Prevention Program Expert Panel's review of the literature and the Expert Panel's experience and opinion.

Stepwise Approach for Managing Asthma in Adults and Children Older Than 5 Years of Age: Treatment

Classify Severity: Clinical Features Before Treatment or Adequate Control

Medications Required to Maintain Long-Term Control

	<u>Symptoms/Day</u> <u>Symptoms/Night</u>	PEF or FEV PEF Variability	Daily Medications
Step 4 Severe Persistent	Continual Frequent	$\leq 60\%$ $> 30\%$	Preferred treatment: <ul style="list-style-type: none"> High-dose inhaled corticosteroids AND Long-acting inhaled beta₂-agonists AND, if needed, Corticosteroid tablets or syrup long term 12 mg/kg/day, generally do not exceed 60 mg/per/day). Make repeat attempts to reduce systemic corticosteroids and maintain control with high-dose inhaled corticosteroids.
Step 3 Moderate Persistent	Daily > 1night/week	$> 60\% - < 80\%$ $> 30\%$	Preferred Treatment: -Low-to-medium dose inhaled corticosteroids AND -long-acting inhaled beta ₂ -agonists. Alternate treatment (listed alphabetically): -Increase inhaled corticosteroids within medium-dose range, OR low-to-medium dose inhaled corticosteroids and either leukotriene modifier or theophylline. If needed (particularly in patients with recurring severe exacerbations): Preferred treatment: -Increased inhaled corticosteroids within medium-dose range and add long-acting inhaled beta ₂ -agonists. -Alternative treatment (listed alphabetically): -Increase inhaled corticosteroids with medium-dose range and add either leukotriene modifier or theophylline.
Step 2 Mild Persistent	$> 2/\text{week but} < 1\text{x/day}$ $> 2 \text{ nights/month}$	$\geq 80\%$ 20-30%	Preferred treatment: -Low-dose inhaled corticosteroids. Alternative treatment (listed alphabetically): Cromolyn, leukotriene modifier, nedocromil, OR sustained-release theophylline to serum concentration of 5-15 mcg/mL.
Step 1 Mild Intermittent	$\leq 2 \text{ days/week}$ $\leq 2 \text{ nights/month}$	$\geq 80\%$ $< 20\%$	No daily medication needed. Severe exacerbation may occur, separated by long periods of normal lung function and no symptoms. A course of systemic corticosteroids is recommended.

Stepwise Approach for Managing Asthma in Adults and Children Older Than 5 years of Age: Treatment



Step Down

Review treatment every 1 to 6 months; a gradual stepwise reduction in treatment may be possible.



Step Up

If control is not maintained, consider step up. First, review patient medication technique, adherence, and environmental control.

Quick Relief

- Short-acting bronchodilator: 2-4 puffs short-acting inhaled beta₂-agonists as needed for symptoms.
- Intensity of treatment will depend on severity of exacerbation; up to 3 treatments at 20 minute intervals or a single nebulizer treatment as needed. Course of systemic corticosteroids may be needed.
- Use of short-acting beta₂-agonists >2 times a week in intermittent asthma (daily, or increasing use in persistent asthma) may indicate the need to initiate (increase) long-term-control therapy.

Goals of Therapy: Asthma Control

- Minimal or no chronic symptoms day or night
- Minimal or no exacerbations
- No limitations on activities; no school/parent's work missed
- Minimal use of short-acting inhaled beta₂ agonist
- Minimal or no adverse effects from medications

Note

- The stepwise approach is intended to assist, not replace, the clinical decision making required to meet individual patient needs.
- Classify severity: assign patient to most severe step in which any feature occurs (PEF is % of personal best; FEV₁ is % predicted).
- Gain control as quickly as possible (consider a short course of systemic corticosteroids); then step down to the least medication necessary to maintain control.
- Minimize use of short-acting inhaled beta₂-agonists. Overreliance on short-acting inhaled indicates inadequate control of asthma and the need to initiate or intensify long-term-control therapy.
- Provide education on self-management and controlling environmental factors that make asthma worse (e.g., allergens and irritants).
- Refer to an asthma specialist if there are difficulties controlling asthma.

Usual Dosages for Long-Term-Control Medications

Medication	Dosage Form	Adult Dose	Child Dose*
Inhaled Corticosteroids <i>(See estimated Comparative Daily Dosages for Inhaled Corticosteroids.)</i>			
Systemic Corticosteroids <i>(Applies to all three corticosteroids)</i>			
Methylprednisolone	2, 4, 8, 16, 32 mg tablets	• 7.5-60 mg daily in a single dose in a.m or qod as needed for control	0.25 mg/kg daily in a single dose in a.m or qod as needed for control
Prednisolone	5 mg tablets 5mg/5cc, 15mg/5cc	• Short-course "burst" to achieve control: 40-60 mg per day as	• Short-course "burst": 1-2 mg/kg/day, maximum
Prednisone	1, 2.5, 5, 10, 20, 50 mg tablets 5 mg/cc, 5 mg/ 5 cc	as single or 2 divided doses for 3-10 days	60 mg/day for 3-10 days
Long-Acting Inhaled Beta₂-Agonists <i>(Should not be used for symptom relief or for exacerbations use with inhaled corticosteroids and should not be prescribed as single agent, only in combo with ICS).</i>			
Salmeterol	MDI 21 mcg/puff DPI 50 mcg/blister	2 puffs q 12 hours 1 blister q 12 hours	1-2 puffs q 12 hours 1 blister q 12 hours
Formoterol	DPI 12 mcg/single-use capsule	1 capsule q 12 hours	1 capsule q 12 hours
Combined Medication			
Fluticasone/ Salmeterol	DPI 100, 250 or 500 mcg/ 50 mcg HFA MDI	1 inhalation bid; dose depends on severity of asthma	1 inhalation bid; depends on severity of asthma
Cromolyn and Nedocromil			
Cromolyn	MDI 1 mg/puff Nebulizer 20 mg/ampule	2-4 puffs tid-qid 1 ampule tid-qid	1-2 puffs tid-qid 1 ampule tid-qid
Nedocromil	MDI 1.75 mg/puff	2-4 puffs bid-qid	1-2 puffs bid-qid
Leukotriene Modifiers			
Montelukast	4 or 5 mg chewable tablet 10 mg tablet	10 mg qhs	4mg qhs (2-5 yrs) 5 mg qhs (6-14 yrs) 10 mg qhs (> 14 yrs)
Zafirlukast	10 or 20 mg tablet	40 mg daily (20mg bid)	20mg daily qhs (>14 yrs)
Zileuton	300 or 600 mg tablet	2,400 mg daily (give qid)	(Liver function monitoring necessary)
Methylxanthines <i>(Serum monitoring is important [serum concentration of 5-15 mcg/mL at steady state]).</i>			
Theophylline	Liquids, sustained-release tablet, and capsules	Starting dose 10 mg/kg/day up to 300 mg max; usual max 800 mg/day	Starting dose 10 mg/kg/day usual max: < 1 yr of age: 0.2 (age in weeks) +5 = mg/kg/day ≥1 yr of age: 16 mg/kg/day

Usual Dosages for Long-Term-Control Medications

Drug	Low Daily Dose		Medium Daily Dose		High Daily Dose	
	Adult	Child*	Adult	Child*	Adult	Child*
Beclomethasone CFC 42 or 84 mcg/puff	168- 504 mcg	84- 336 mcg	504- 840 mcg	336- 672 mcg	>840mcg	>672 mcg
Beclomethasone HFA 40 or 80 mcg/puff	80- 40 mcg	80- 160 mcg	240- 480 mcg	160- 320 mcg	> 480 mcg	> 320 mcg
Budesonide DPI 200 mcg/inhalation Inhalation suspension for nebulization (child dose)	200- 600 mcg	200- 400 mcg 0.5 mg	600- 1,000 mcg	400- 800 mcg 1.0 mg	>1,200	>800 mcg 2.0 mg
Flunisolide CFC 250 mcg/puff	500- 1,000mcg	500- 750 mcg	1,000- 2,000 mcg	1,000- 1,250 mcg	> 2,000 mcg	> 1,250 mcg
Fluticasone HFA: 44, 110, or 220 mcg/puff DPI: 50, 100, 250 mcg/ inhalation	88- 264 mcg	88- 176 mcg	264- 660 mcg	176- 440 mcg	> 600 mcg	>440 mcg
	100- 300mcg	100- 200 mcg	300- 600 mcg	200- 400 mcg	> 600 mcg	>400 mcg
Triamcinolone acetanide CFC 100 mcg/puff	400- 1,000 mcg	400- 800 mcg	1,000- 2,000 mcg	800- 1,200 mcg	>2,000 mcg	1,2000 mcg

Asthma

Definition

Asthma is an obstructive disease of the lungs caused by inflammation of the airway epithelia, increased mucous production in airways, and tightening of smooth muscles surrounding the airways. Inflammation causes recurrent episodes of wheezing, breathlessness, chest tightness, and cough particularly at night and in the early mornings. These episodes are usually associated with widespread but variable air flow obstruction that is often reversible either spontaneously or with treatment. The inflammation also causes an associated increase in the existing bronchial hyper-responsiveness to a variety of stimuli. (National Heart, Lung and Blood Institute)

Normal Bronchiole



Asthmatic Bronchiole



Causes of asthma

There are no certain causes of asthma, but strong correlations exist between environmental and genetic factors, such as exposure to cigarette smoke, chemicals, dust and specific molds. There is also a higher risk of developing asthma if a parent or sibling has asthma or allergies.

Prevalence

Asthma is one of the most common chronic diseases in the United States. The National Center for Health Statistics reports that the burden of asthma has increased over the past two decades; an estimated 21.9 million adults have been diagnosed with asthma in their lifetime.

In 2004, it was estimated that 118,400 Utahns are under medical care for asthma; persons aged 18-29 and 55-64 experienced the highest prevalence of asthma. Prevalence of asthma among adult females is higher than males. Adults with asthma reported almost two or more days physically ill during the past month than those without asthma.

Utah Asthma Program, Bureau of Health Promotion, Asthma in Utah, UDOH 2004.

Asthma occurs in response to various “triggers.” Each person with asthma may have different triggers, which could include:

Environmental

Air Pollution
Cigarette Smoke
Strong odors or perfumes
Chemicals (cleaning supplies)
Weather changes
Cold or windy weather
Humid or dry weather

Allergens

Dust mites
Cockroaches
Pet dander
Pollens
Weeds
Grass
Molds

Others

Medications: Aspirin (in sensitive individuals)
Medications containing sulfites as a preservative, β -blockers, including eye drops
Strong emotions: Laughing, crying, and stress.
Exercise
Viruses/Infections
Food Preservatives (sulfites)

Initial Assessment

Key Points

- Establish a correct diagnosis.
- Determine the severity level to approximate where to begin therapy.
- Schedule for regular follow-up care to step up or down therapy.
- Monitor β_2 -agonist use.
- Provide written action plan for exacerbations and education.
- Patients who have moderate or difficult to control asthma should be referred to a specialist for evaluation and recommendations

Establish diagnosis

Signs and symptoms

Cough, wheeze, shortness of breath, rapid breathing, chest tightness: any combination of these symptoms is indicative of asthma. Asthma may exist with no wheeze. Occasionally, coughing may be the only symptom.

Symptom patterns: Is there a pattern to symptoms?

- Onset, duration, and frequency
- Diurnal, seasonal, or environmental variations: a pattern of symptoms at specific seasons could

indicate allergy-related asthma. A pattern of symptoms year-round, however, does not exclude the asthma diagnosis. Changes in air quality and inversions can also cause symptoms in people with asthma.

- Interference with daily activities (missed school, or work)
- Determine how many work days are missed, if any, in a month; how many urgent doctor visits; if any Emergency Department (ED) visits; and if the person is not doing activities because of asthma (not exercising, not participating in a hobby, etc.)

Acute presentation

- Precipitating or aggravating factors.
- Indoor and outdoor triggers and personal characteristics (emotions, stress):
- Determine if the patient wakes up in the middle of the night, or earlier in the morning than planned, due to asthma symptoms.

Physical Examination

Findings that increase the probability of asthma include:

- Wheezing, either during normal breathing or prolonged forced exhalation.
- Hyper expansion of the thorax, use of accessory muscles, and tachypnea.
- Atopic dermatitis or eczema
- Signs of allergy including: swelling of and/or pale nasal mucosa and clear nasal discharge.

There are several illnesses that mimic asthma, and/or that need to be ruled out when considering asthma as a diagnosis.

Differential diagnosis includes the following:

- Chronic obstructive pulmonary disease (COPD)
- Congestive heart failure (CHF)
- Pulmonary embolism
- Mechanical obstruction (tumors)
- Pulmonary infiltration with eosinophilia
- Cough secondary to drugs (ACE inhibitors)
- Laryngeal dysfunction

Medical History

Determine the following:

1. If the patient has not previously been diagnosed with asthma

- Patterns of exacerbations.
- Duration, frequency and intensity.
- Severe persistent cough, recurring respiratory illness, gastroesophageal reflux, congestive heart failure or COPD.

2. If the patient has previously been diagnosed with asthma.

- Asthma/allergy-related history and allergy-related asthma triggers.
- Medications that have/have not worked in the past.
- Change in home and work environment.
- Changes in physical activity.
- Change in medications, including prescriptions, over-the-counter, and supplements.

Patients are at higher risk of developing life-threatening attacks if...

- They have had an asthma attack at any point in their life that required hospitalization they are at high risk for another severe and possibly life threatening attack. Such patients are often unable to discern minor attacks from life threatening events on the basis of symptoms alone. These patients must be very carefully observed and aggressively treated during an asthma attack.
- They have a history of depression.
- They are resistant or not compliant to treatment.

Medications

If the patient has previously been diagnosed with asthma, ask about the following:

- Determine what medications have or have not worked.
- Try to determine why previous medications/ treatments did not work: technique, compliance, adequate dosing?
- Determine if the patient has been on asthma medication prior to your current treatments.
- What other medications are they taking, including over-the-counter, vitamins and other supplements?
- Short-acting bronchodilator (rescue medications): use/frequency.
- Determine the frequency of use of rescue medications. If short-acting bronchodilators are being used more than twice a week, or if frequent nighttime awakenings or symptoms are keeping them from daily activities, consider stepping up the treatment.

Family History

Family history of atopy (asthma, allergy, atopic dermatitis). In the acute setting, it is often difficult to obtain a detailed family history. However, it is useful to know as much as possible about any other first degree relatives with asthma, especially if there is any family history of severe or refractory asthma, hay fever, eczema or if any family members have died of asthma.

(Information provided by Wayne Samuelson, M.D. University of Utah Medical Center, Department of Internal Medicine)

Classifying Severity

Clinical Features Before Treatment

The presence of one of the features of severity is sufficient to place a patient in that category. An individual should be assigned to the most severe grade in which any feature occurs.

For adults and children aged > than 5 years who can use a spirometer or peak flow meter

Classification	Step	Symptoms*	Nighttime Symptoms	FEV1 or PEF** percent predicted normal	PEF variability (%)
Severe persistent	4	Continual symptoms Limited physical activity Frequent exacerbations	Frequent	< 60%	> 30%
Moderate persistent	3	Daily symptoms Daily use of inhaled short-acting beta 2-agonist Exacerbations affect activity Exacerbations > 2 times a week; may last days	> 1 per week	>60% - <80%	> 30%
Mild persistent	2	Symptoms > 2 times a week but < 1/day Exacerbations may affect activity.	> 2 per month	> 80%	20% - 30%
Mild intermittent	1	Symptoms < 2/week Asymptomatic and normal PEF between exacerbations Exacerbations brief (from a few hours to a few days; intensity may vary)	< 2 per month	> 80%	< 20%

*Patients at any level can have mild, moderate, or severe exacerbations. Some with intermittent asthma experience severe and life threatening exacerbations separated by long period of normal lung function and no symptoms.

**Percentage predicted values for forced expiratory volume in 1 second (FEV1) and percentage of personal best for peak expiratory flow (PEF).

Adapted from the NHLB Guidelines for the Diagnosis and Management of Asthma, Expert Panel Report 2, NIH Publication No 97-4051, July, 1997 [Shirley: 1997]

Prescribe medications according to severity level

Mild intermittent Asthma

Isolated asthma attacks in patients with mild-intermittent asthma may be treated as needed with short-acting β_2 agonist drugs such as albuterol alone (a “rescue” medication). Patients who need to use a rescue inhaler more than 2-3 times a week should be considered for chronic therapy.

Persistent Asthma

Effective treatment of chronic asthma symptoms should always include anti-inflammatory (“controller”) agents. Inhaled corticosteroids are the best option in this regard. The efficacy of combination therapy with moderate dose corticosteroid and long acting β_2 -agonist bronchodilator drugs is clear. The use of the combination results in greater anti-inflammatory effect than is seen with higher dose corticosteroid therapy alone without increasing the risk of steroid-related side effects. Patients who do not respond to these measures should be referred to a specialist.

(Information provided by Wayne Samuelson, M.D. University of Utah Medical Center, Department of Internal Medicine)

Inhaled Corticosteroids

The physician should select the product to be used based on specific symptoms of the patient, severity of asthma, other conditions or diseases the patient may have other medications that the patient may be taking to avoid potential drug interactions, and cost and coverage of prescription benefit. Listed below are the drugs in this class with dosing information.

Beclomethasone Oral Inhalations (Beclovent(no longer available), QVAR, Vancertil (No longer available)).

- Typical dosing 1-2 inhalations daily.
- Used in children greater than 6 years old

Budesonide Inhalations Solution

- Typical dosing 1-2 inhalations daily.
- Used in children greater than 6 years old

Flunisolide Oral Inhalation (Pulmicort Respules)

- Typical dosing 1-2 inhalations daily.
- Used in children greater than 6 years old

Fluticasone Inhalations Aerosol (Flovent)

- Typical dosing 1-2 inhalations daily.
- Can be used in children 12 years and older.

Fluticasone Powder for Oral Inhalation (Flovent Rotadisk)

- The only corticosteroids available in powder form.
- Can be used in patients 4 years and older

Triamcinolone Oral Inhalation (Asmacort)

- Typical dosing 1-2 inhalations daily however can be inhaled up to three or four times daily.
- Used in children greater than 6 years old

Inhaled corticosteroids have different potencies. Even though this does not correlate with efficacy it should still be considered when selecting a corticosteroid. In the *Guidelines for the Diagnosis and Management of Asthma*, Expert Panel Report, of the National Asthma Education and Prevention Program suggests that fluticasone is more potent than beclomethasone and budesonide, which in turn is more potent than triamcinolone and flunisolide. Fluticasone is the most potent inhaled corticosteroid. More potent inhaled corticosteroids may require a fewer number of inhalations to control asthma exacerbations.

Spacers improve how well the drug deposits in the lungs, and they also reduce yeast infections in the mouth (patient can also reduce this by rinsing the mouth after using medications). Spacers cannot be used with dry powder inhaler.

Therapy Goals

The goal is to completely prevent symptoms and side effects from medications, symptoms, and exacerbation of asthma. That is not always possible, so the next goal is to minimize those as much as possible.

- Minimal or no chronic symptoms day or night
- Minimal or no exacerbations
- No limitation on activities; no school/work missed
- Maintain (near) normal pulmonary function
- Minimal use of rescue medications (short-acting inhaled β 2-agonist)
- Minimal or no adverse effects from medications

When Optimal Therapy is Achieved

Optimal therapy has been achieved when therapy goals are met:

- Rescue medications are not needed regularly.
- Lung function is 80% of predicted normal or better.
- Symptoms do not limit activities or work.
- There are no (or few) night awakenings due to asthma.

Once optimal therapy is attained for a period of several weeks to months, begin gradually reducing dose until asthma control is maintained with a minimum amount of medication. This will reduce the potential for side effects of medication without compromising control.

Follow-up care

General recommendations:

After patient's asthma is well-controlled on minimal maintenance medication, routine follow-up care should occur every 6-12 months. When a patient's asthma is not controlled, they may need to be seen every two weeks until control is obtained.

Follow-up pulmonary function testing:

Recommendations: Pulmonary Function Tests should be used to diagnose asthma, establish that control has been achieved, and the test should be done every 1-2 years for well-controlled asthma.

Follow-up visits should focus on:

- Night awakenings
- Daytime symptoms
- Symptoms that are keeping patient from normal activities
- Education (device technique)
- Management: review controller medication frequency, when to step up (if at all), etc.
- Management goals: determine what goals the patient would like to set regarding their asthma management. For example, do they want to participate in a sport or hobby they have not been able to because of asthma, etc.

Monitor use of β -2 agonists

β -2 agonists are used to control and prevent symptoms, maintain normal activity levels, and to prevent exacerbation. They are used specifically for acute asthma exacerbations and to prevent exercised-induced asthma. They are not recommended for regular daily therapy because extended use may lead to deterioration in asthma control. If a patient is using β -2 agonists on a daily basis, asthma should be reassessed; proper treatment should then be applied for improved control of symptoms to limit use of β -2 agonists.

Co-morbid Conditions

Some specific co-morbid conditions that may complicate the treatment of asthma include:

- Sinus disease
- Allergies
- Respiratory infections
- Gastroesophageal reflux disease (GERD)
- Cardiac Conditions: Knowledge of any coexisting heart problems is particularly important. β -blocker drugs commonly used in the treatment of cardiac disease may trigger or prolong bronchospasm. Adrenergic bronchodilator drugs may precipitate and/or aggravate cardiac arrhythmias.
- β -blocker eye drops used in the treatment of glaucoma may also interfere with bronchodilator function and make asthma difficult to control.
- Frequency of use of rescue medication.

Consider evaluation by Asthma Specialist:

1. When further testing is required to establish diagnosis when diagnosis is not clear-cut, or when there is a possibility for complicating conditions
2. When atypical or difficult clinical situations arise
3. When patient had difficulty managing symptoms
4. When any history of asthma-related hospitalization, life-threatening attacks/intubation
5. Identifying triggers

Objective Measurements (non-acute)

Key points

- Spirometry is used to diagnose asthma, to monitor lung function over time, and to compare spirometry from baseline in order to determine if asthma is under control or worsening.
- Peak Flow Meters are used at home by the patient to learn to recognize when they need to step up medication, call the doctor, or go to the emergency room.
- Poorly controlled asthma can affect every aspect of a person's life, but asthma under control should not limit anything the person does.

Spirometry

Spirometry is considered the “gold standard” measure of lung function. A spirometry test is performed before and 15-20 minutes after inhalation of a short-acting bronchodilator and will indicate:

Significant reversibility: At least a 12% increase and 200mL in forced expiratory volume in 1 second (FEV1) after inhaling a short-acting bronchodilator or receiving a short (2-3 week) course of oral corticosteroids.

Airflow obstruction is indicated by reduced FEV1 and FEV1/FVC values relative to reference values.

Peak Expiratory Flow (PEF)

A handheld device the patient uses at home to monitor their asthma. It correlates with the FEV1 of the larger airways when the person exhales into it.

- Patients with severe asthma should take PEF readings two or three times a day. The overall goal should be to achieve a less than 20% (and ideally only 10%) variation in readings between evening and morning rates. For mild to moderate asthma, a single determination each morning usually suffices, but you should monitor this for exceptions.
- It is important to use the meter at the same times each day and to stand or sit in the same position in order to keep an accurate record.
- Patients should keep an ongoing record of their peak flow readings to help them detect worsening of their condition.
- They should also record attacks, exposure to any allergens or triggers, and medications taken. After about two months, patients and physicians can use the data recorded for administering medications effectively and to recognize problems before they become serious.

*** Peak flow monitoring has neither been shown to be more effective or less effective than symptom based management. A person can learn to recognize their symptoms on a symptom-based approach rather than by peak flow monitoring with adequate education.**

Limitations to Peak Flow monitoring

Peak flow monitoring helps you and patient to determine course of treatment; however, there are some limitations when measuring peak flow:

- Lacks diagnostic sensitivity of spirometry: PEF measures only large airway function and does not detect mild changes.
- Wide variation in reference values: each model of meter varies in comparison to other models.
- May underestimate asthma symptoms in people whose asthma attacks come on suddenly.

Successful Management Tools:

Key Points

- Asthma management plan is a written document to remind the patient about daily medications and follow-up visits, when to step up medications and what to do in an emergency. It may include what activities should or should not be done based on peak flow measurements or symptoms.
- Education is necessary for the patient to know how to avoid and treat asthma attacks.
- A critical part of preventing asthma attacks is determining the triggers and educating the patient on how to avoid those triggers.

Develop written asthma management plan

Because asthma is a chronic disease with no cure, it is crucial to manage it. The individual with asthma can learn to manage their illness by taking controller-type medications as prescribed, taking rescue medications as prescribed, avoiding their triggers, and understanding what asthma is and what can cause exacerbations. There are tools that make this easier on the physician and their staff.

Asthma management plans are an essential part of asthma management because it includes information a patient is likely to forget before returning home from the visit. For example, it may include information about when to increase medications.

An asthma management plan is different from an asthma action plan. A **management plan** indicates what a patient is to do to manage their asthma on a daily basis while an **action plan** indicates when a patient is in trouble, and what a patient should do when experiencing an asthma exacerbation.

Asthma Management Plan

Individual management plans should be developed by the physician with the patient. Different people have different requirements and specific triggers that initiate their attacks and need to be avoided. The management plan should be guided by the severity of the person's asthma, the benefits and risks of each treatment, and the availability of the various forms of treatment. Routine follow-up care is an integral part of good management. As people with asthma grow and change, their asthma also changes, and their management plan needs to address those changes. An asthma management plan should serve as a communication tool between the physician, the person with asthma, and his or her family.

The following items should be addressed in the Asthma Management Plan:

- Daily controller therapy medication names, dosages, and frequency
- Management goals
- Physician contact information
- Triggers
- Frequency of physician visits when well
- Reminder for annual flu vaccine

Action Plan for Exacerbations

An action plan is a written, customized plan to help your patient manage asthma exacerbations. The action plan is based on changes in respiratory symptoms and peak flow numbers. The action plan should give your patient or family member information about when and how to use daily medications, emergency medications and your peak flow meter. It will also help the patient to know when to call a health care provider or seek emergency medical care. Taking action can prevent asthma from getting worse. If patients know what to watch for and what steps to take, they will be able to make timely and appropriate decisions about managing their asthma.

The asthma action plan should include the following information:

- **Peak flow numbers** measure how well the patient is breathing. If the peak flow numbers drop it means they are having trouble breathing. You will need to consider certain characteristics of the patients' asthma to help you determine the zones.
- **Asthma Symptoms such as:** coughing, wheezing, shortness of breath and chest tightness. The action plan should tell the patient what to do when they are awakened in the night with symptoms and when to increase treatments to manage asthma symptoms. The plan should be based on the severity or seriousness of these symptoms.
- **Asthma Medications**
There are different types of medications that the patient should take to control and treat symptoms. You will need to develop instructions about when to take asthma medications.
- **Emergency Telephone Numbers and Location of Emergency Care**

As the health care provider specifically answer these five questions, clearly and precisely for each of your patients with asthma and include it in either the asthma management or action plans.

- **When** should they call their physician?
- **When** they should seek emergency care?
- **When** is quick relief medicine not enough?
- **When** or if you should use/increase inhaled steroids?
- **When** or if you should start taking oral steroids?

Patient Education

Teach and reinforce at every opportunity:

- Basic facts about asthma
- Roles of medications
- Skills: inhaler/spacer/holding chamber use, self monitoring
- Environmental control measures
- When and how to take rescue actions

Patient education should:

- Should begin at the time of diagnosis and be integrated into every step of clinical asthma care.
- Should be provided by all members of the health care team. Education provided by the physician should be reinforced by all staff members.
- Patient education should be tailored to the needs of the patient. Form a partnership with the patient so they feel included in all aspects of their treatment plan.
- Develop goals together and provide patients with handouts, information, and other tools to encourage adherence by promoting open communication.
- Encourage family involvement, listen to concerns, and adjust plans and goals as needed.

Tips for patient education in the time constraints of an office visit.

- Don't overwhelm the patient, split up the information over several appointments.
- Be prepared with handouts, information and other tools before the visit.
- Remind patient to bring medications and management plans to the appointment for review.
- Train staff members to assist with education.
- Teach and reinforce at every opportunity.

Partner to control triggers

- People with dust allergies may find benefits in using allergy-proof mattress and pillowcase covers, having someone else dust or use a mask while dusting, and finding other methods of avoiding dust.
- A patient with pet allergies should not have that animal in their house. If they insist on keeping the pet in the house, the pet should not be on furniture or in the bedrooms.
- Cleaning supplies: get someone else to do the cleaning if possible. If not, use a mask while cleaning, and be sure to clean in a well-ventilated room.
- Vacuum often.
- Avoidance and/or pretreatment: When possible, avoid situations that will trigger asthma. If it is unavoidable, pre-treat with albuterol inhaler.
- Wear a scarf around nose and mouth on cold and/or windy days.
- Remain indoors or limit outside activities on days when air quality is poor.
- Don't allow smoking in home or car.

Special Considerations

Acute Asthma: Description of typical exacerbation

Most patients experience shortness of breath in association with acute asthma attacks. This is generally associated with chest tightness, chest pain, cough and/or wheezing. Not all attacks are associated with identifiable triggers.

Patients generally prefer to sit up during an attack, bracing their arms or elbows on their legs or some other solid surface. This is referred to as the 'tripod' position.

Therapy

In acute asthma attacks bronchodilator therapy should be instituted immediately. It is appropriate to start a nebulized albuterol treatment while vital signs and initial history are being obtained. Measurement of peak expiratory flow is usually not necessary to confirm the severity of the attack. The peak flow maneuver may actually aggravate symptoms. Most asthma centers use ipratropium solution in combination with albuterol for the initial nebulized treatment. When it is not possible to use a nebulizer, albuterol can be administered by metered dose inhaler. If this is the initial mode of therapy, it is highly recommended that the metered dose inhaler be used with a spacer or valved holding chamber and that the inhalations be supervised and/or assisted by a provider experienced in inhaler use to ensure proper use of inhaler technique. Dose may need to be increased to as many as 6-8 puffs to see similar improvement as with nebulizer treatment.

Despite the immediate need to reverse bronchospasm, it is important to remember that asthma is an inflammatory illness. The foundation of therapy is control of inflammation, essential to both controlling the asthma attack and preventing long term sequelae from inadequately treated asthma.

The initial history usually gives clues as to possible triggers or other factors that may have initiated or exacerbated the attack. If the attack is associated with an exposure, care should be taken to assure that the exposure has ended. This may involve removal of clothing that could be carrying dust, pollen, dander, etc. along with washing the skin or hair. Sinus and other respiratory infections commonly aggravate asthma symptoms and should be sought for. Antibiotic therapy should be instituted only if a treatable infection is identified. The use of "routine" antibiotics is not recommended and may be counterproductive.

If it appears that the asthma attack was precipitated by a concomitant illness or by the therapy for that illness, it may be necessary to hospitalize the patient.

If the initial treatment with albuterol [or ipratropium] is ineffective or incompletely effective, it should be repeated 20 minutes after the first one was started. In most cases, a third treatment can be safely given after another 20 minutes. Hospitalization should be considered for patients whose attack does not respond to three consecutive albuterol treatments. Because they are not bronchodilators, inhaled corticosteroid drugs have little utility in the treatment of acute asthma attacks. Systemic corticosteroid drugs (oral or intravenous) have a slow onset of action but are frequently initiated in the acute care setting. Use of long-term corticosteroid drugs carries significant risk of side effects. Follow-up care for all patients started on steroids in the acute setting is essential to assure an orderly withdrawal from systemic therapy and transition to maintenance with inhaled corticosteroid medications.

Head and Neck Exam

The head and neck exam is often unremarkable, but the provider should look carefully for any evidence of sinus or upper airway infection. Such infections are commonly associated with more severe asthma.

Cardiac Exam

The cardiac exam is important. Tachycardia is a common physical finding. (Both the attack and the medications used to treat it stimulate the heart rate.) Patients are usually hypertensive. Any new arrhythmia that emerges during an asthma attack is an indication for immediate hospitalization and monitoring.

Chest Exam

Tachypnea is common early in the attack. The respiratory rate slows as the attack progresses. Wheezing is commonly noted on auscultation of the chest, but is not universally present. A “quiet” chest is a very concerning sign as it is associated with very severe bronchospasm, mucus plugging, barotrauma or a combination of all three.

The chest examination may be deceiving. Wheezes are generally heard and are the classic physical finding. Absence of wheezing on exam may indicate that the attack has reached a new and more severe stage where the level of airway obstruction is severe enough to preclude airflow sufficient to cause audible wheezes. Wheezing may become more apparent as the patient responds to therapy. Asymmetry of exam may be a sign of pneumonia, mucus plugging and/or pneumothorax.

Laboratory Findings

Very little laboratory work is required to manage acute asthma. Eosinophilia is commonly seen in patients with a strong allergic component to their asthma. Mild leukocytosis is not unusual, and is often seen as a response to stress. Corticosteroid medications administered during the attack may also elevate the white blood cell count. High or prolonged dosing with adrenergic bronchodilator drugs can be associated with electrolyte abnormalities. Arterial blood gas measurements are not routinely indicated, but should be considered if the attack fails to respond to aggressive therapy. Straightforward asthma attacks are characterized by respiratory alkalosis. A normal or elevated PaCO₂ obtained during an ongoing attack suggests that the patient is tiring and that ventilatory failure is imminent. Such patients should be hospitalized immediately as they often require intubation and mechanical ventilation.

Radiology

The chest radiograph is often normal in an acute asthma attack. Still, a posterior-anterior (PA) and lateral chest x-ray is indicated in the evaluation of an acute attack. Often, previously undetected pneumonia or other pulmonary disease is discovered. Improved imaging techniques allow the radiologist to recognize bronchial wall thickening with increasing frequency. Barotrauma (interstitial emphysema, pneumomediastinum, pneumothorax, etc.) related to the asthma attack may also be identified.

Life-Threatening Attacks

The presence of mental status changes, arrhythmias, asymmetric chest examination, hypoxemia or hypercarbia is an indication of a life-threatening attack. The patient should be hospitalized immediately, in an intensive care unit if possible. A normal or elevated PaCO₂ obtained during an ongoing attack suggests that the patient is tiring and that ventilatory failure is imminent.

Specialist Care

Patients who suffer frequent severe attacks despite appropriate therapy should be referred to a specialist for further evaluation. Any patient who requires intubation for asthma should be referred to a specialist.

(Information provided by Wayne Samuelson, M.D. University of Utah Medical Center, Department of Internal Medicine)

Related Problems & Issues

Nutrition	Obesity and overweight aggravate asthma symptoms and associated conditions. It also, limits mobility and exercise.
Sleep	Nocturnal symptoms are common. Obstructive sleep apnea may aggravate asthma symptoms and contributes to GERD Sleep can be significantly affected when asthma is poorly controlled, but should rarely be affected when under control.
Ear/Nose/Throat	Sinus disease and rhinitis commonly complicate asthma. Vocal cord dysfunction may masquerade as asthma.
Immunity/Infectious Diseases	Immune deficiencies may predispose to bronchiectasis and sinusitis. Any respiratory infection can trigger or worsen asthma symptoms.
Respiratory	Upper respiratory Coexisting sinusitis, recurring ear infections, [etc] are common in people with asthma. Lower respiratory infections: frequent colds, flu, bronchitis and pneumonia are also common.
Mobility	Patients often limit their activities because of asthma. Consistent healthy activity is important to avoid deconditioning.
Activities of Daily Living	When properly controlled, asthma should not affect activities of daily life. When poorly controlled, may reduce activity level and affect exercise and other activities. Significant asthma may interfere with maintenance of ADLS.
Medications/Pharmacology/ Side Effects	Most asthma medications are well tolerated. Care must be taken to avoid side effects from and interactions with other medications. Shaky or jitteriness is not unusual with bronchodilators.
Leisure	Most asthmatics are limited by deconditioning and not by asthma severity. Asthma patients should be encouraged to exercise if their asthma is well controlled. People with severe asthma, or who have had severe attacks, will want to be prepared for asthma attacks when traveling including having enough medication to last the trip, carrying rescue medication with them, and avoiding known triggers.
Family	Encouragement and support from family and loved ones is an essential component of comprehensive asthma therapy. Asthma uncontrolled can be stressful on family and family relationships.

Women and Asthma (Including Pregnancy)

Key Points

- Inhaled controller medications are usually safe for pregnant women to take, because poorly controlled asthma is a greater risk to the fetus than risks of medications.
- Some women's asthma during pregnancy seems to get better, a few women's asthma may get worse, but an asthma attack during delivery is rare.
- It is not uncommon for asthma symptoms to worsen in relation to the menstrual cycle.

Women and Asthma

In adulthood, women are more likely than men to be diagnosed with asthma and are more likely to be hospitalized for severe exacerbations. There have been several studies suggesting that there is a link between hormones and asthma. It has been suggested that the increase of asthma in women with age is attributed to hormone changes and menstruation. One course of action is to have the patient track their asthma symptoms if symptoms worsen around menstruation. You and the patient can develop a plan of action specially for menstruation to prevent severe exacerbations and hospitalizations.

Another concern for women with asthma is bone loss with steroid treatment. It is important to monitor bone loss in asthma patients and take appropriate action to prevent this from occurring with proper dosages, supplements, etc.

Pregnancy

Asthma in pregnancy is an important challenge. In approximately half of cases asthma symptoms and severity are not affected by pregnancy. Some women report that their asthma improves during pregnancy. The remainder will notice worsening asthma symptoms. The risk to the fetus is generally far greater from the asthma attack itself than it is from the medications used to treat asthma. Withholding effective asthma therapy during pregnancy exposes both the mother and her baby to serious risks that include death. It is far better to avoid acute asthma attacks during pregnancy than it is to treat them. Hyperventilation (as is generally seen in even mild asthma attacks) has been associated with decreased uterine artery flow in animal studies. Aggressive preventive measures and careful monitoring during pregnancy are critical.

(Information provided by Wayne Samuelson, M.D. University of Utah Hospital, Department of Internal Medicine)

Work-Related Asthma

Key points

- It is important to differentiate between different types of work-related asthma to ensure proper treatments.
- There are many substances attributed to work-related asthma. It is important to ask about exposure to these substances when treating a patient.
- Bronchodilators, anti-inflammatory medications and patient education are all components of disease treatment and management.

Asthma can affect all aspects of life, including work. Asthma may develop as a result of work-related exposure. In fact, it is estimated that up to 20% of new asthma cases may be a result of exposure at work. Asthma can also be triggered by work-related triggers. There are different types of work-related asthma. It is important to be familiar with causes, symptoms and treatments for all types.

Work-Aggravated Asthma: patient who has a history of preexisting asthma, who is experiencing recurrent symptoms and attacks attributed to a nonspecific mechanism.

Occupational Asthma: Develops as a direct result of workplace exposure. There are two forms of occupational asthma.

Reactive Airway Dysfunction Syndrome (irritant-induced), usually develops after a single, very high exposure to an irritant chemical.

Allergic Occupational Asthma (latency-associated occupational asthma) a patient with this form of asthma develops a sensitization to a specific agent in the workplace, e.g. latex.

Occupations

Certain occupations put people more at risk for developing asthma due to chemicals the individual may be exposed to on the job. The majority of incident work-related cases include exposure to the following:

Substances	Examples	Possible Occupations
Air pollutants	Tobacco smoke, diesel exhaust, and aerosol agents	Mechanics, waitresses, road workers, firefighters
Animal dander	Cats, dogs, birds	Animal handlers, rancher, farmer, veterinarians, zoo workers
Dusts	Wood, rock, coal	Miners, carpenters, builders
Foods	Egg, wheat, nuts	Food workers, farmers
Fumes	Chemicals, cleaning material, and welding fumes	Welders, pharmaceutical workers, housekeepers
Medications	Aspirin, anti-inflammatory drugs	Pharmaceutical industry workers, health care workers
Mites/Molds	Dust, plants, birds	Construction, biology, horticulture, landscapers, housekeepers, maintenance workers
Pollens	Trees, flowers, weeds, hay, grain	Forester, farmers, lawn care workers, landscapers, nursery (green house) workers.

Type of Allergen or Irritant	Examples	Possible Occupations
Fumes & Vapors	Solvents, isocyanates, anhydride, (from heating and cooling quickly).	Mechanics, police officers, firefighter, rubber operations, welders, pottery making, plastics operations.
Gases	Formaldehyde, ammonia, chlorine, sulfur dioxide, ozone, nitrogen oxides	Health care workers, miners, police officers, firefighters, chemists
Animal substances and organic dusts	Bacterial dusts, hair, mites, protein dusts, cockroaches, small insects	Animal handlers
Inorganic dusts	Coal, silica, asbestos	Maintenance workers, plumbers, builders, miners,
Smoke	A variety of dusts, gases and vapors depending upon what is burning, and tobacco smoke.	Firefighters, waitresses, mining
Mists	Paints, lacquers, varnishes, hair spray, pesticides, cleaning products, acids, oils, and solvents.	Painters, hairstylist, rancher, farmers, housekeepers, gardeners

Diagnosis

If work-related asthma is suspected:

- **First step:** Establish the correct diagnosis. Use a spirometry test or other testing procedures; get full work and medical history to find out as much as possible about what substances the patient could have been exposed to, when symptoms began and when they feel better or worse.
- **Second step:** Determine relatedness to work. Have the patient keep a peak flow diary, including pre/post shift readings, when they experience symptoms, and a list of substances that they are exposed to at work, including Materials Safety Data Sheets available at workplace.
- **Third step:** It is important to differentiate between work-aggravated asthma, occupational asthma, and allergic occupational asthma, to ensure that the appropriate management plan is put in place.

Source: Occupational Respiratory Disease: Your workplace and your lungs – www.familydoctor.org

Disease Treatment and Management

Disease management consists of identifying triggers at the workplace, and counseling the patient on methods of avoidance. This will require the cooperation of the employer. Provide information to the patient to pass on to their employer explaining the condition, how to assist in managing symptoms, and ideas on improving working conditions for the patient. Educate the patient on the proper use of respiratory equipment. Patients with work-aggravated or irritant asthma can continue to work if conditions are improved and treatment is applied. A patient diagnosed with allergic occupational asthma should be completely removed from the trigger. Continued exposure is associated with significant morbidity and occasionally, mortality. Standard treatment of asthma is applied; anti-inflammatory medications; bronchodilators and patient education are all important steps to controlling asthma.

Once asthma is in control, routine follow-up visits should occur every 6-12 months. If asthma is not in control the patient should be seen every two weeks until control is achieved.

1. Arnaiz NO, Kaugman JD. New developments in work-related asthma, Clin Chest med, 2002 Dec;23(4):737-47
2. Cullinan, P., Clinical aspects of occupational asthma. Panminerva Med, 2004. 46(2): p. 111-20
3. Youakim, S., Work-Related asthma. American Family Physician, 2001 64(11): p. 1839-48

Seniors and Asthma

Key Points

- Asthma in the elderly is often under-diagnosed and under-treated
- Asthma can develop later in life, however it is difficult to diagnose in older adults because of other respiratory and cardiac diseases.
- Medications used to treat other diseases, such as cardiovascular disease, may render asthma rescue medications useless, or can have other unwanted effects.

Asthma in older adults (ages 65 and older) can be serious. In Utah, older adults with asthma are nearly twice as likely to be hospitalized because of asthma, stay twice as long, and cost almost twice as much as younger adults with asthma. (Utah Asthma Program, Bureau of Health Promotion, *Asthma In Utah*, Utah Department of Health 2004). This is probably because of other co-existing conditions such as cardiovascular disease or other respiratory diseases. These are also the very reasons asthma is difficult to diagnose and treat in the older adult. Additionally, it is estimated that about half of older adults with asthma are undiagnosed.

Diagnosing asthma in older adults

Asthma in the older adult is much more difficult to diagnose than in younger people for many reasons. First, many older adults already have chronic respiratory or cardiovascular conditions that could mask asthma symptoms. The characteristic finding of asthma is reversibility of the airway constriction. Chronic obstructive pulmonary diseases (COPD) are marked by little if any reversibility after spirometry. However, some people with asthma may have decreased lung function so they may not demonstrate reversibility, and people with COPD can experience exacerbations that can reverse. There is a challenge in diagnosing and treating respiratory diseases in older adults because there is some overlap in symptoms and key findings. Asthma may worsen COPD and COPD may worsen asthma. Consider treatments for both possibilities simultaneously.

Complications and co-morbid conditions

The likelihood of the patient having a chronic cardiovascular condition in addition to asthma presents another challenge in treating older adults with asthma. Because some medications used to treat cardiovascular diseases are β -blockers, they may decrease the effect of β -agonists such as bronchodilators. The risks and benefits should be carefully weighed for both conditions.

Medications and older adults

The medications used to treat asthma in the elderly do not differ significantly from those for younger patients. However, the risk of adverse effects from asthma treatment is greater, as discussed in the following section on long-term management, and the potential for drug interactions is greater because of many coexisting conditions. It is important to be aware of coexisting diseases and conditions, monitor patient use of medications, and watch for adverse side-effects associated with different medications including:

- Beta2-agonist and theophylline use should be monitored carefully because they can cause tachyarrhythmias and aggravate ischemic heart disease. Theophylline should be used with caution, especially in patients with congestive heart failure. It can cause cardiac arrhythmias, nausea and vomiting from gastric irritation, gastroesophageal reflux, insomnia, hypotension, hypertension, tremor and seizures.
- Systemic corticosteroids may aggravate congestive heart failure and lower serum potassium with potentially adverse cardiac effects. Corticosteroids in high doses may reduce bone mineral content and may accelerate development of osteoporosis. The National Asthma Education Prevention Program notes that older adults are more frequently prescribed oral steroids than inhaled steroids to manage asthma, because there are higher risks of side effects with oral steroids (bone density, changes in blood sugar level, cataracts, glaucoma). **inhaled steroids are the preferred method of treatment.**

Ipratropium bromide may be useful, especially for those elderly patients with asthma who have chronic obstructive pulmonary disease or who experience tremor, angina, or arrhythmias from beta2-agonists.

Note: It is important to establish the appropriateness of asthma medications and doses by regularly evaluating the patient's response to therapy. Review of patient technique in taking medications is also important; a failure to respond adequately to therapy is often a result of improper medication inhaler technique.

Non-asthma Medications with increased potential for adverse effects in the elderly patient with asthma.

Medication	Comorbid Condition(s) for which Drug is Prescribed	Adverse Effect	Comments
Beta-adrenergic blocking agent	Hypertension Heart Disease Tremor Glaucoma	Worsening asthma Bronchospasm Decreased response to bronchodilator Decreased response to epinephrine in anaphylaxis	Avoid where possible; when must be used, use a highly beta-selective drug.
Non-steroidal anti-inflammatory drugs	Arthritis Musculoskeletal diseases	Worsening asthma Bronchospasm	Not all elderly with asthma have non-tolerance of NSAIDs, but are best avoided if possible
Non-potassium sparing diuretics	Hypertension Congestive heart failure	Worsening cardiac function/dysrhythmias due to hypokalemia	Additive effect with anti-asthma medication that also produce potassium loss (steroids, beta-agonist) elderly also more likely to be receiving drugs (e.g., digitalis where hypokalemia is of increased concern
Cholinergic agents	Urinary retention Glaucoma	Bronchospasm Bronchorrhea	Note that some over-the-counter asthma medications contain ephedrine, which could aggravate urinary retention, glaucoma
ACE inhibitors	Heart failure Hypertension	Increased incidence of cough	

Table adapted from NAEPP Guidelines, Asthma in the Elderly.

Frequently Asked Questions

It's expected that, even after medications, a person with asthma will still have limitations, right?

No. If asthma is in control, there should be no limits to what a person can do. They should be able to participate in all activities they enjoy with no symptoms. People with asthma should still practice trigger avoidance and pre-medicate when necessary to prevent asthma attacks.

What is the concern about Serevent, Foradil, and Advair? I have several patients on them and they do not seem to have any problems with them.

These drugs are a long-acting beta-agonist (LABA), and a long-acting bronchodilator medicine combined. It is important to read and follow the FDA Warning concerning these drugs. (www.fda.gov/cder/drug/Drug-Safety/DrugIndex.htm). The concern is the following: some people, based on their genotype, will get worse when a beta-agonist is added, so patients should not be started automatically on LABA since it is not possible to currently or practically test for this genotype. If the level of control suggests a LABA be added they should be monitored for deterioration closely (clinically and objectively) after they begin therapy on LABA. Patients who are on it and doing well generally have already cleared that hurdle and should be advised of the warning, but in most cases would just continue on.

If in doubt regarding dosing level of medication, I should go down and step up if necessary, right?

No. You should **step up** and **then step down**. Following the National Asthma Education Prevention Program's Stepwise medication approach, it is important to first establish the level of severity (see establishing severity in this manual). Therapy should be started at a higher level than the patient's step of severity at the onset to establish prompt control once. Control is obtained then step down. Continuous monitoring is essential to ensure that asthma is in control.

How often should I schedule follow-up with a patient whose asthma is under control?

When patient's asthma is well-controlled, routine follow-up care should occur every 6-12 months.

I have a patient whose asthma is not under control. I have to see her about every two weeks. Is this excessive?

No. When a patient's asthma is not controlled, they may need to be seen every two weeks until control is obtained.

How often does GERD complicate asthma?

Gastroesophageal reflux disease (GERD) is very common in asthma. The common symptoms of GERD (heartburn, dysphagia, waterbrash) may not be present. GERD should be considered in adherent patients who fail to respond to an appropriate asthma regimen. Patients should be advised to avoid excessive caffeine intake, alcohol, overeating and late night snacks. Aggressive (usually twice daily) treatment of GERD complicating asthma is generally required.

My patient has a cardiac condition for which a β -blocker drug is indicated. Can this be done safely in an asthmatic?

Some recent articles have suggested that "selective" β -blocker drugs are safe to use for asthma. Other data suggest that a completely selective β -blocker drug is not yet available. Extreme caution should be used in prescribing these agents to asthma patients, carefully balancing the risks and benefits of both conditions.

How useful is the combination of a long-acting β_2 -agonist bronchodilator and moderate dose inhaled corticosteroid?

Combination therapy has become the standard of care. When used in combination, these two drugs are superior to high dose inhaled corticosteroid used alone. In the United States, there is only one inhaler that provides the combination of salmeterol and fluticasone. However, formoterol and budesonide, which are available as a combination inhaler in Europe are both available as separate preparations in the United States and can be prescribed for simultaneous use.

Does the 'float test' work in determining how much medication is left in my MDI?

No. In the past, people that used metered-dose inhalers (MDI's) were told to remove their canister from their inhaler and put in a bowl of water. If the canister sinks, it is full; if the canister floats, it is empty. This is NOT a good measure of leftover medication. Keeping track of approximate number of times it is used can help to determine amount of medication used. HFA preparations stop working when out (CFC still expell propellant) and Ventilin HFA now has a counter,

What are the effects of caffeinated cola drinks on asthma?

Caffeine is in the same chemical group as theophylline. It has a modest, short lived bronchodilating activity. However, the rather modest beneficial effect of caffeine is not worth the potential for adverse effects of large doses of caffeine (stimulatory), particularly in children. Inhaled beta-agonists such as albuterol induce a lot more bronchodilation than caffeine with likely less prominent (more transient) stimulation. Neither caffeine nor albuterol have the anti-inflammatory effects of inhaled steroids needed to control the chronic inflammation underlying chronic asthma. Current guidelines from the National Asthma Education and Prevention Program (NHLBI) emphasize the need for chronic anti-inflammatory therapy for persistent asthma.

Is there a proper way to take MDIs and other asthma medications?

Yes. Metered-dose inhalers (MDI) are used to treat asthma symptoms by delivering an exact amount of sprayed aerosolized medicine. When used properly inhalers are a safe, convenient, and effective treatment option. There are several types of inhalers. Some are used with a spacers, or masks depending on the ability of the patient to use inhalers correctly. There are also inhaled medications that are in powder form. They also have specific methods in use. It is important for patients to receive instructions on use and demonstrate proper use of their asthma medications.

Is exercise healthy for people with asthma?

Yes, maintaining an active lifestyle is important for both physical and mental health. Remember asthma is not a reason to avoid exercise. Controlled, structured exercise will improve conditioning, reduce weight, and improve cardiopulmonary function. As a result asthma becomes more difficult to trigger. Exercise will improve quality of life and help control asthma.

How can patients with asthma exercise?

Inhaled medications taken prior to exercise can control and prevent exercise-induced symptoms. The preferred medications are the short acting beta₂-agonists. Taken 15-20 minutes before exercise, these medications can prevent airways from contracting and control exercise-induced asthma for as long as 4-6 hours. Long-acting beta₂-agonists can provide 12-hour control. It is important to assess the needs of your patient and prescribe according to their needs. It is a reasonable goal for asthmatics to experience no symptoms while exercising or participating in physical activity. However, many asthmatics settle for substantially less.

References

Agraz, J and Lee, C

Asthma in Utah 2004 - Update.

Utah Asthma Program, Bureau of Health Promotion, Utah Department of Health; (2004)

<http://health.utah.gov/asthma/data.html#2004>. (916kb).

Accessed on July 2, 2005.

CDC

Asthma Prevalence, Health Care Use and Mortality, 2002.

National Center for Health Care Statistics, Centers for Disease Control; (2002)

<http://www.cdc.gov/nchs/products/pubs/pubd/hestats/asthma/asthma.htm>. (110kb).

Accessed on July 2, 2005.

Shirley Murphy, MD (Panel Chair), et. al.

Guidelines for the Diagnosis and Management of Asthma, Expert Panel Report 2, Clinical Practice Guidelines.

National Asthma Education and Prevention Program of the National Heart, Lung, and Blood Institute, National Institutes of Health; (1997)

<http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf>. (1MB).

Accessed on July 1, 2005.

Clark JA, Lieh-Lai M, Thomas R, Raghavan K, Sarnaik AP.

Comparison of traditional and plethysmographic methods for measuring pulsus paradoxus.

Arch Pediatr Adolesc Med. 2004;158:48-51.

PubMed abstract

Shirley Murphy, MD (Panel Chair), et. al.

Guidelines for the Diagnosis and Management of Asthma, Expert Panel Report 2, Clinical Practice Guidelines.

National Asthma Education and Prevention Program of the National Heart, Lung, and Blood Institute, National Institutes of Health; (1997)

<http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf>. (1MB).

Accessed on July 1, 2005.

Williams SG, Schmidt DK, Redd SC, Storms W.

Key clinical activities for quality asthma care.

Recommendations of the National Asthma Education and Prevention Program.

MMWR Recomm Rep. 2003;52:1-8.

PubMed abstract

Full Text

Lemanske RF Jr.

Viruses and asthma: Inception, exacerbation, and possible prevention.

J Pediatr. 2003;142:S3-7; discussion S7-8.

PubMed abstract

Agraz, J and Lee, C

Mortimer KJ, Harrison TW, Tattersfield AE.

Effects of inhaled corticosteroids on bone.

Ann Allergy Asthma Immunol. 2005;94:15-21; quiz 22-3, 79.

PubMed abstract

Ram FS, Cates CJ, Ducharme FM.

Long-acting beta2-agonists versus anti-leukotrienes as add-on therapy to inhaled corticosteroids for chronic asthma.

Cochrane Database Syst Rev. 2005;CD003137.

PubMed abstract

Szeffler SJ, Apter A.

Advances in pediatric and adult asthma.

J Allergy Clin Immunol. 2005;115:470-7.

PubMed abstract

IHC Primary Care Clinical Program Asthma Workgroup

Management of Asthma - 2004 Update.

Intermountain Health Care, Clinical Programs; (2004)

<http://www.ihc.com/xp/ihc/documents/clinical/103/8/3/cpmasthma.pdf>. (668kb).

Accessed on July 1, 2005.

William W. Busse, MD (Panel Chair), et. al.

Expert Panel Report: Guidelines for the Diagnosis and Management of Asthma. Update on Selected Topics 2002.

National Asthma Education and Prevention Program of the National Heart, Lung, and Blood Institute, National Institutes of Health; (2003)

<http://www.nhlbi.nih.gov/guidelines/asthma/asthmafullrpt.pdf>. (481kb).

Accessed on July 1, 2005.

William W. Busse, MD, (Panel Chair), et. al.

Quick Reference - NAEPP Expert Panel Report Guidelines for the Diagnosis and Management of Asthma Update on Selected Topics 2002. National Asthma Education and Prevention Program of the National Heart, Lung, and Blood Institute, National Institutes of Health; (2002)

<http://www.nhlbi.nih.gov/guidelines/asthma/execsumm.pdf>. (66kb).

American Academy of Allergy, Asthma, and Immunology

www.aaaai.org/patients/publicedmat/tips/asthmaandpregnancy.stm

www.aaaai.org/patients/seniorsandasthma/gerd.stm

www.aaaai.org/patients/seniorsandasthma/asthma_emergency.stm

www.aaaai.org/patients/publicedmat/tips/occupationalasthma.stm

Asthma Triggers and Management

<http://www.meddean.luc.edu/lumen/MedEd/medicine/Allergy/Asthma>

Environmental Protection Agency

www.epa.gov/aging/solutions/Solutions6_1.pdfma/asthlrc.html

Mayo Clinic

<http://www.mayoclinic.com/health/occupational-asthma/DS00591>

NAEPP Guidelines for Asthma in the Elderly

http://www.nhlbi.nih.gov/health/prof/lung/asthma/as_elder.pdf

National Jewish Medical Center

<http://www.njc.org/>

<http://www.nationaljewish.org/disease-info/diseases/asthma/about/types/occupation.aspx>

National Heart Lung and Blood Institute

www.nih.gov/news/pr/jan2005/nhlbi-11.htm

<http://www.nationaljewish.org/disease-info/diseases/asthma/living/pregnancy/living-with.aspx?#monitor>

<http://www.nhlbi.nih.gov/health/prof/lung/asthma/astpreg.htm>

Occupational, Safety and Health Administration (OSHA)

<http://www.osha.gov/SLTC/occupationalasthma/>

<http://Familydoctor.org/040.sml?printxml>

Pregnancy and Asthma

<http://www.aaaai.org/patients/advocate/2003/spring/women.stm>

Womenshealth.gov

www.womenshealth.gov/pub/steps/Asthma.htm

Traveling with Asthma

www.aaaai.org/patients/publicedmat/tips/travelinewithallergies.stm

Authors: Wayne Samuelson, MD
Kristina Marsh, MPH, CHES
Rebecca Jorgensen

Reviewed by:
Asthma Task Force Provider/Health Systems Action Groups.
Wayne Samuelson, MD
Wayne Cannon, MD
David Gourley, MD

